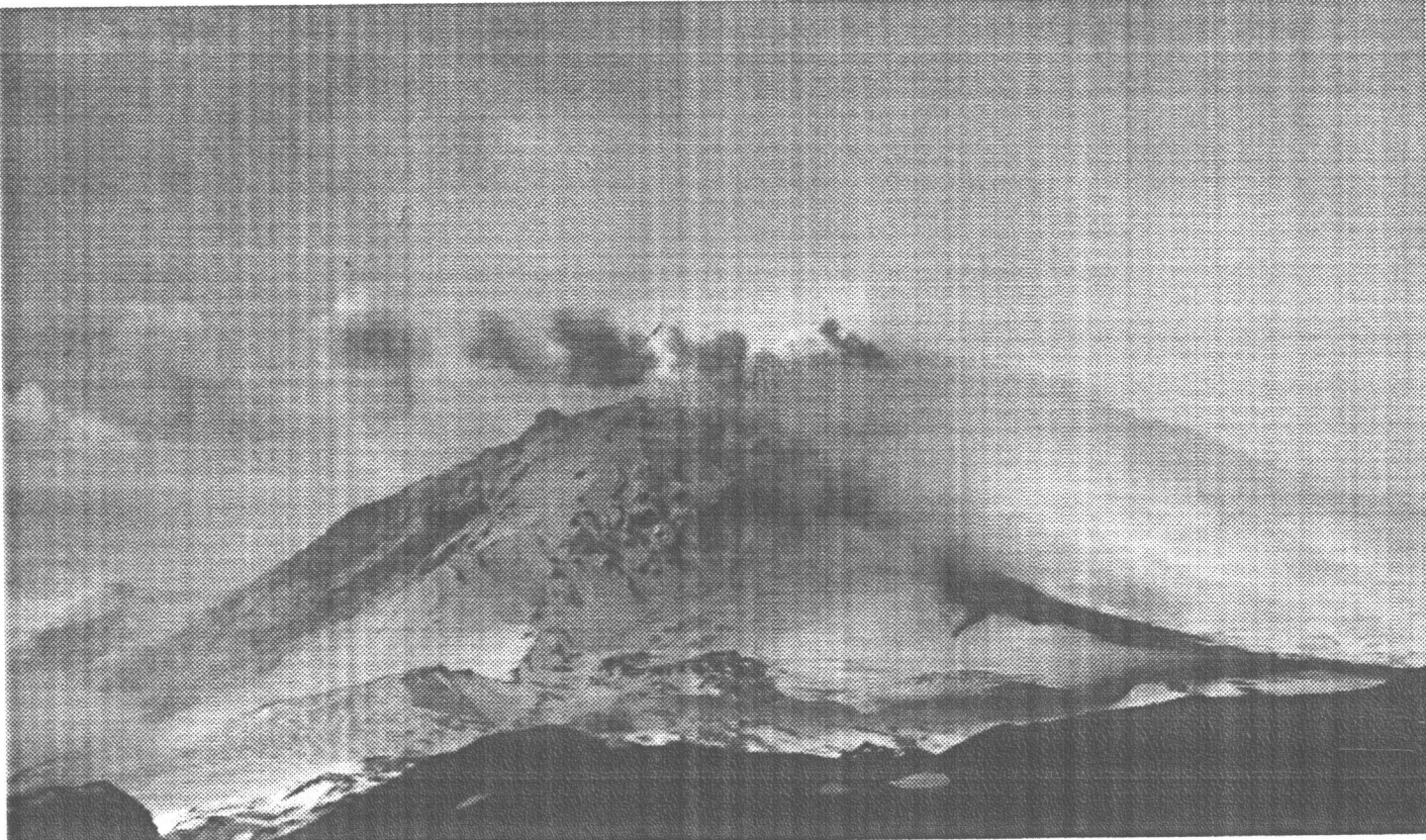


## STROMBOLIAN ERUPTIONS AT PAVLOF VOLCANO AND HAZARDS FROM VOLCANIC ASH CLOUDS

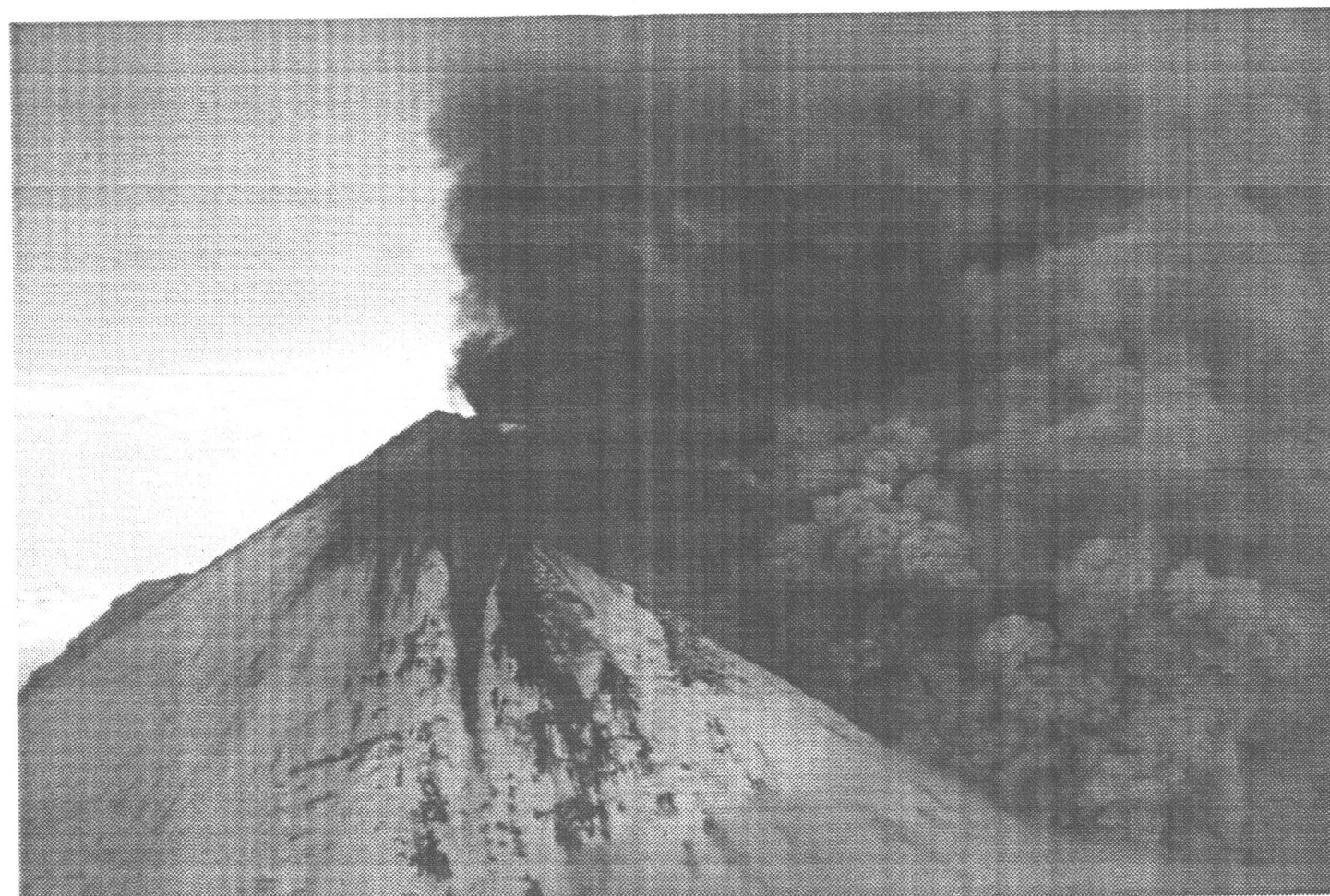


Pavlof Volcano and its satellite vents, Pavlof's Sister and Little Pavlof, are near the western tip of the Alaska Peninsula, about 950 km southwest of Anchorage, Alaska. Pavlof has been one of the most active volcanoes in the Aleutian volcanic arc, with more than 30 known periods of volcanic activity since the mid-1700's. Both Pavlof's Sister and Little Pavlof are Holocene in age, but neither are known to have erupted in historic time. This preliminary hazard assessment does not include these volcanoes.

Pavlof Volcano has a *strombolian* eruptive style. Strombolian eruptive activity consists of a series of explosions at the surface of a magma column caused by the rapid expansion of magmatic gasses. These discrete explosions generally last a few seconds or less and may be rhythmic or intermittent. The explosive bursts are often distinctly audible as a rumbling or thunder-like noise.

Strombolian explosions usually eject fragments of hot, glowing spatter to heights of tens to hundreds of meters above the vent. Typical exit velocities are about 100 meters per second. At night, these glowing fragments trace parabolic paths as they fall back into the vent or onto the volcano's flanks. Occasionally, the explosions can be so closely spaced in time that the glowing ejecta forms spectacular rooster-tail shaped lava fountains extending 100 meters or more above the vent.

In a typical strombolian eruption, the volume of erupted material is usually small (0.01 to 0.1 cubic kilometers of magma) and the eruption column may reach only a few hundred meters above the vent. Usually, a sustained eruption column does not develop and relatively little volcanic ash (tephra) is erupted (unlike the more vigorous eruptions of Redoubt and Mount Spurr Volcanoes). During many Pavlof eruptions, a series of brownish pulses of dusty tephra climb to heights of a few hundred meters above the vent before being rapidly dispersed by the wind. During vigorous Pavlof explosions, these pulses of tephra reach heights of 5 to 7 kilometers above the vent. Volcanic ash could extend as high as 11 kilometers above the vent during extreme, but rare eruptions.

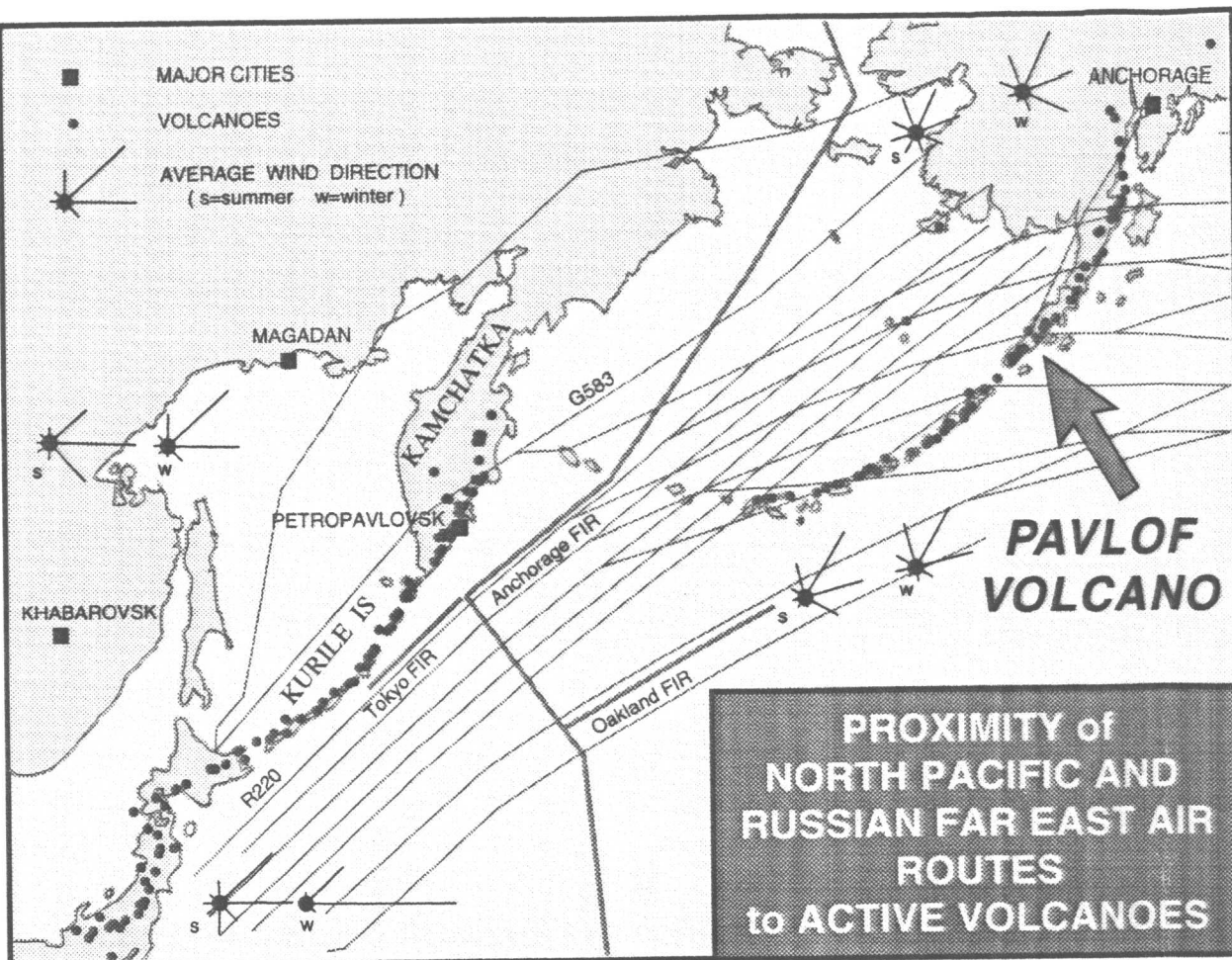


The upper photo shows pulses of dusty volcanic ash erupted during rhythmic explosions in 1986. The lower photo shows a steam and ash plume produced during a sustained explosion in 1986.

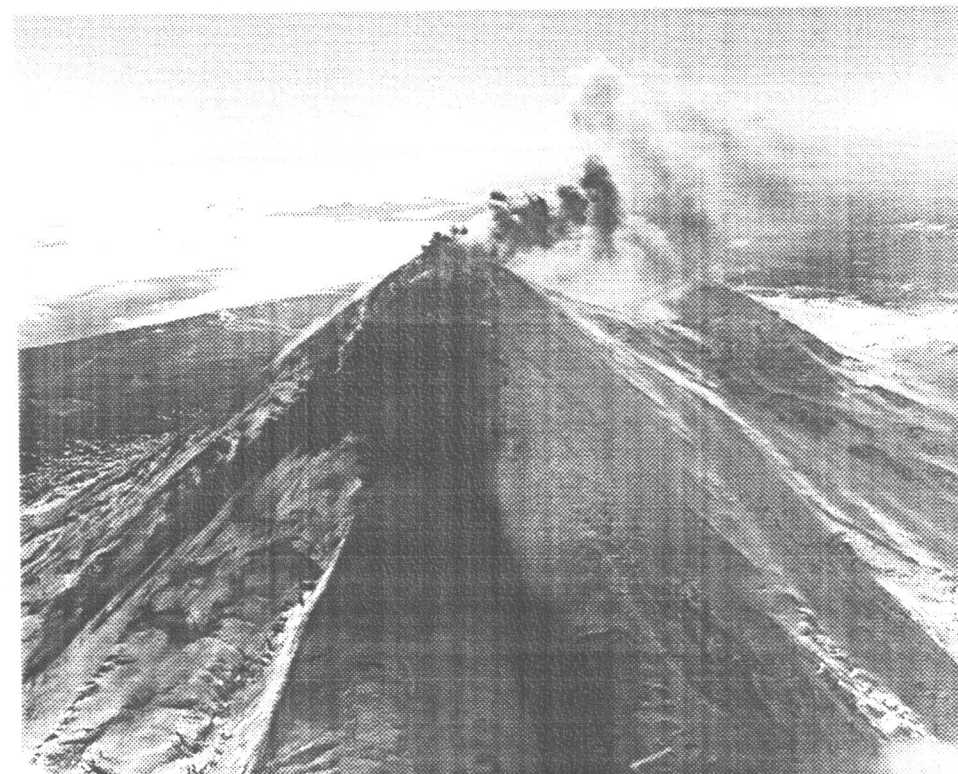
### HAZARDS FROM AIRBORNE ASH AND ASH FALLOUT

Although emissions of volcanic ash from Pavlof are generally not voluminous, communities near the volcano can receive frequent light dustings of fine ash. The amount of ash carried by the wind will depend on wind speed and direction. Most ash clouds consist of sand-sized and smaller ash particles, steam, and other gasses. An ash-laden plume is typically dark colored, whereas plumes composed mostly of water vapor and volcanic gas (generally present in non-toxic concentrations) tend to be light colored. Aircraft flying near the volcano could be affected by even small amounts of tephra and all visible tephra plumes should be avoided. Because tephra bursts may extend 5 to 7 kilometers above the volcano there is a substantial hazard to all aircraft especially at night when it would be difficult to detect a tephra plume.

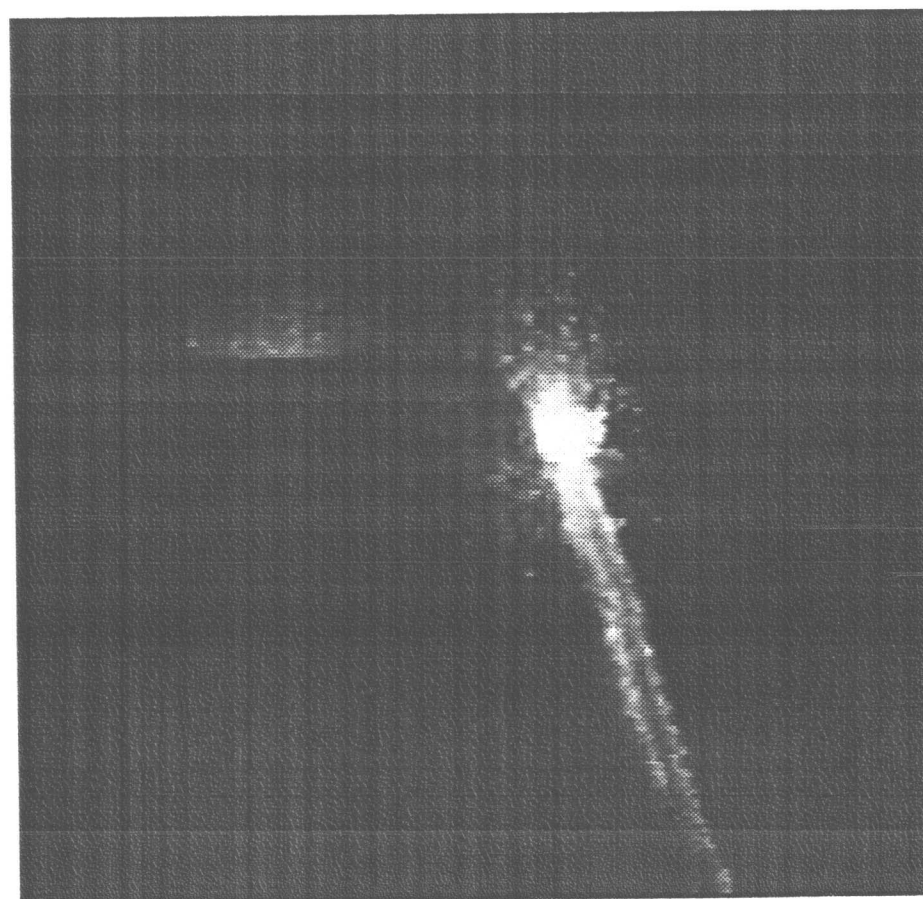
Tephra fallout from Pavlof Volcano may be a nuisance to people and may damage water supplies, machinery and electronic equipment. Although unlikely, heavy tephra fall could collapse buildings.



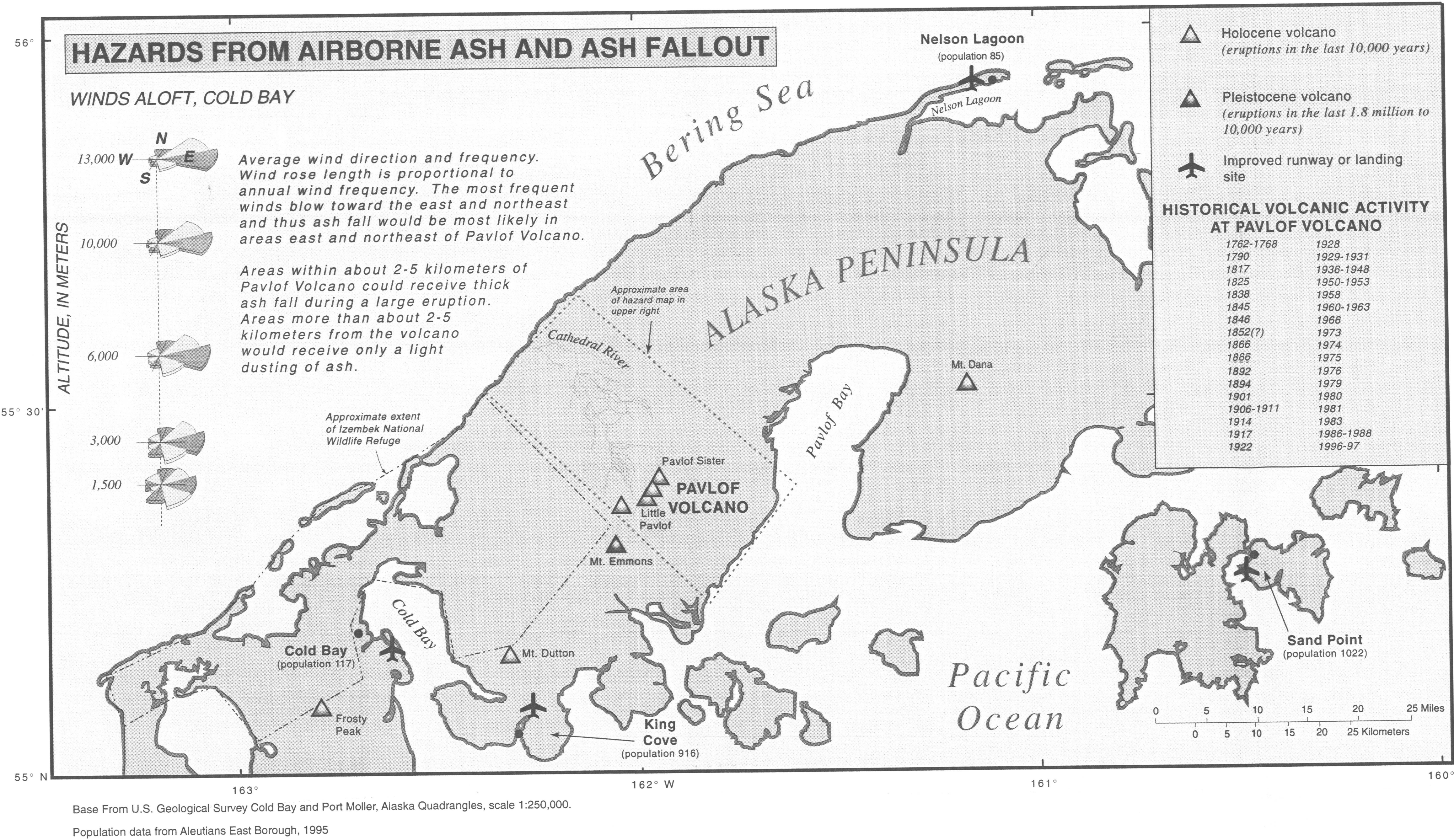
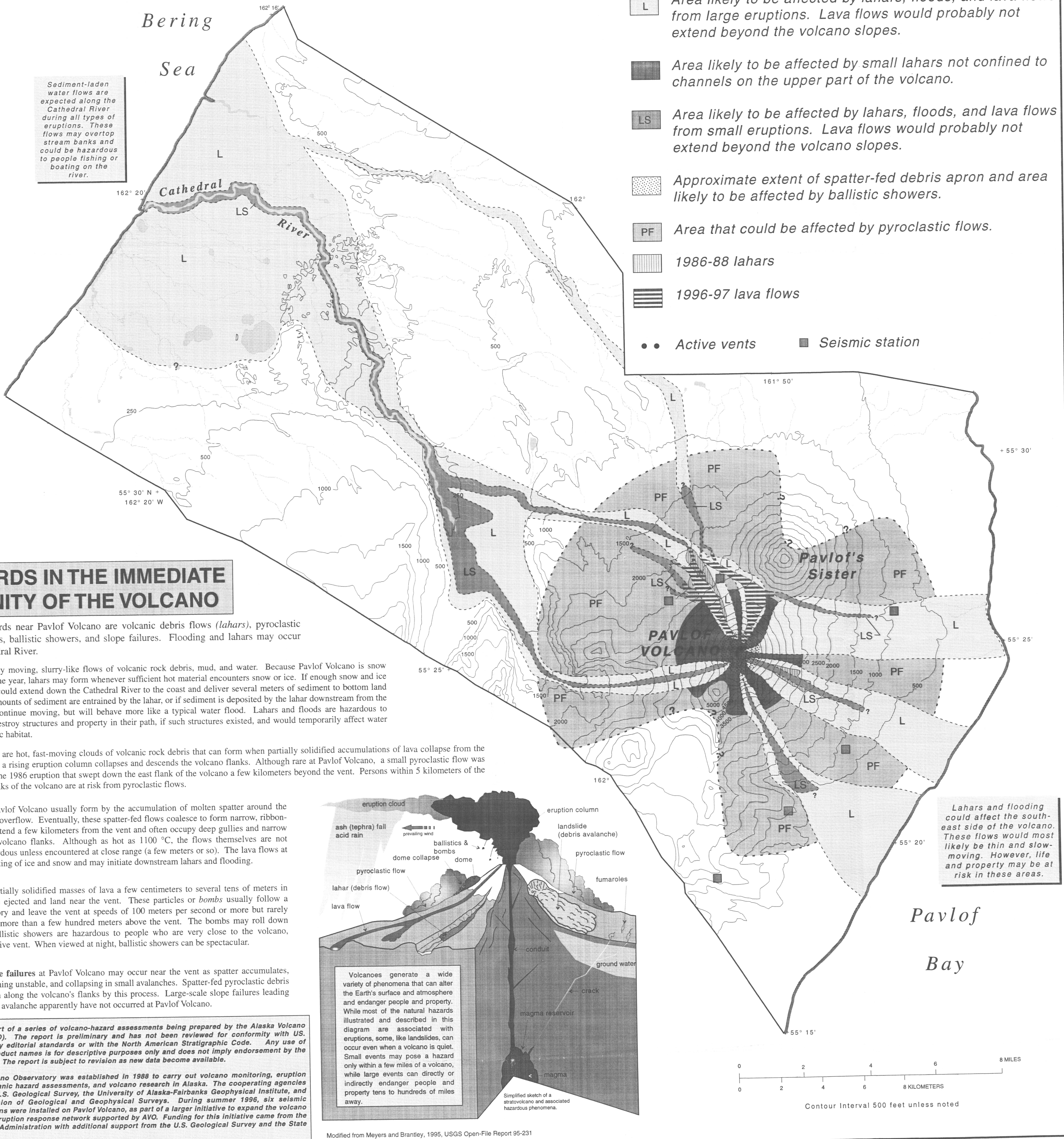
Jet aircraft traveling the North Pacific and Russian Far East air routes pass over or come close to numerous active volcanoes including Pavlof. During eruptions, clouds of volcanic ash often occupy the airspace used by these aircraft. Many thousands of people per day and a vast amount of air cargo are transported via these air routes.



Pavlof Volcano, September 29, 1996. The dark linear bands are spatter-fed lava flows. These flows extend almost to the base of the volcano. The other dark-colored areas near the summit are spatter-fed pyroclastic debris aprons. Note the small "puff-like" ash plume which is typical of strombolian eruptions. Photograph courtesy of Aeromap, U.S.



Night view of strombolian eruption at Pavlof Volcano, September 29, 1996. Strombolian activity at the southern vent (right) feeds a lava flow. Mild strombolian activity is occurring at the northern vent (left).



## PRELIMINARY VOLCANO-HAZARD ASSESSMENT FOR PAVLOF VOLCANO, ALASKA

By

Christopher F. Waythomas, Thomas P. Miller, Robert G. McGimsey, and Christina A. Neal

1997